

# NASA TECH BRIEF

## Lyndon B. Johnson Space Center



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### Stiffness and Mass Matrices for Shells of Revolution (SAMMSOR II)

#### The problem:

A program to generate stiffness and mass matrices for shells of revolution was needed.

#### The solution:

A program was written to accept a description of the structure, in terms of the coordinates and slopes of the nodes and the properties of the elements joining the nodes, and generate the required matrices.

#### How it's done:

For shells with simple geometries (such as cylinders, shallow caps, and hemispheres), shell geometry can be internally generated. Utilizing element properties, the structural stiffness and mass matrices are generated for as many as twenty harmonics and stored on magnetic tape. The matrices generated constitute input data to be used by other stiffness of revolution programs. One advantage of creating the stiffness and mass matrices in a separate program is that a variety of analyses can be performed on the same shell configuration without having to determine the matrices more than once.

Therefore, a variety of boundary and loading conditions can be employed without having to create new mass and stiffness matrices for each case.

#### Notes:

1. This program was written in FORTRAN IV for the CDC 6000 and IBM 360 series computers.
2. Inquiries concerning this program should be directed to:

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Reference: MSC-14494

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